



**Includes comprehensive design library**

## FEATURES

### Prom Programmer

8708 UV Erasable, Electrically Reprogrammable ROMs (EPROMs) can be easily programmed, compared, and transferred to RAM using the zero-insertion force socket on the panel. A new technique allows 8708 to be partially programmed in multiple blocks of 16 bytes. Thus, small modular routines can be entered, tested, and readily saved using EPROM. EPROMs can also be conveniently duplicated. The master (original) device plugs into the ISBC 80/10 inside PROMPT 80 and can be copied to the panel programming socket. 8755 EPROMs can also be programmed, compared and transferred over any address range using the optional adaptor PROMPT 875.

### Register/Display Group

All 8080 registers can be displayed, even while single stepping programs. The registers are shown in three rows:

First row	B	C	D	E
Second row	H	L	Flags	A
Third row	Program counter		Stack pointer	

One register row is visible at a time. Three small LEDs to the left of these rows indicate which row is displayed. The scroll register display command displays the next row (first, second, third, etc.)

### Reset, Interrupts

The system reset command (SYS RST) resets the system, initializes the PROMPT 80/85 registers, and enters the monitor. The monitor interrupt command (MON INT) interrupts a user program and enters the monitor saving the user registers. The user interrupt command (USR INT) traps PROMPT 80/85 to location 3C02<sub>16</sub>.

### Monitor

A comprehensive system monitor resides in three 1K ROMs. It displays, drives PROMPT's keyboard, and responds to commands and functions. The monitor is modular, organized so that the third ROM may be removed if functions are not required. This allows sizable user routines — as much as 2K ROM/EPROM and nearly 1K RAM — to be exercised.

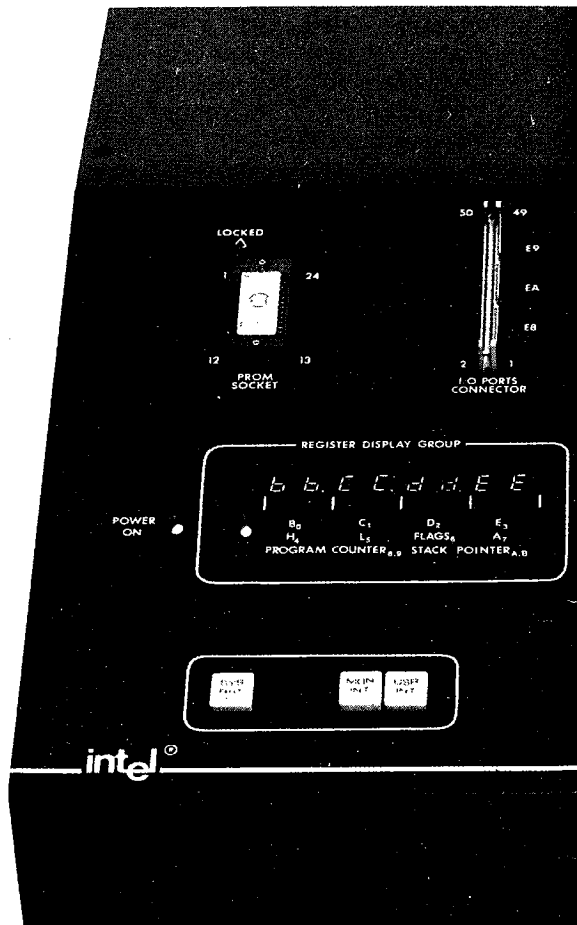
### Commands

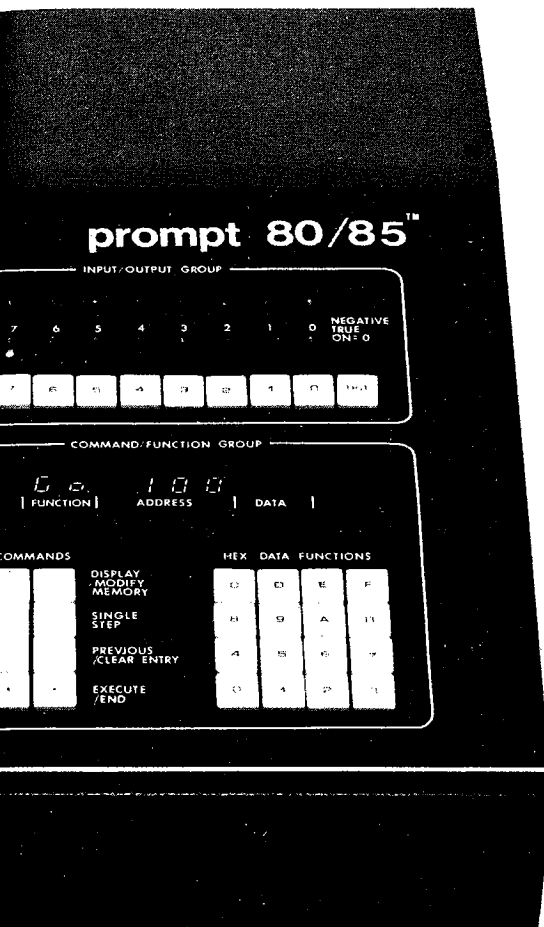
PROMPT 80/85 commands are compatible with those used by Intel's SDK ISBC, and Intellec monitors. A register command may be operated with either an examine/modify command or display/modify memory command. Then either the next or previous register and memory locations can be opened with one button. The go command executes programs, allowing multiple optional breakpoints. Or a program can be single stepped, executed one instruction at a time. The scroll register display command displays the next row of the register/display group. Commands are entered naturally, like phrases in a sentence: the next (NEXT) parameters are separated by commas and command sentences end with EXECUTE/END. The commands do what makes sense. For example:

GO ☐ 1 ☐ 0 ☐ 0 ☐ EXECUTE/END  
starts the program at address 100.

GO ☐ 1 ☐ 0 ☐ 0 ☐ NEXT ☐ 2 ☐ 0 ☐ 0 ☐ EXECUTE/END  
starts the program at 100, but stops at 200, a breakpoint.

GO ☐ ☐ EXECUTE/END  
starts the program where it was last stopped.





## Parallel I/O

The I/O ports connector provides easy access to 24 parallel, TTL compatible lines. These lines are addressed as three ports (each 8 lines), port E8, E9, and EA. These ports can be defined to be Input or output by software. Defining control words, tabulated in "Specifications," are sent out (OUT) to port EB, the control word register.

## Serial I/O

PROMPT's programmable serial I/O readily interfaces with most terminals. Jumpers select either 20 mA teletypewriter (TTY) current loop or RS232C operation, and the appropriate communications frequency. Asynchronous or synchronous transmission, data format, control characters, parity, and transmission rate can be programmed. A serial cable kit, PROMPT-SER, connects PROMPT to either a teletypewriter or RS232C standard (CRT) terminal through a rear chassis access slot. Teletypewriters may require minor reader control modifications.

## Command/Function Displays

The command/function displays show addresses and data when displaying memory, and parameters for commands and functions are entered.

## Functions

Eight functions are provided by PROMPT. Others may be added by the user. Pressing a hex data/functions key (0-7) starts a function as shown in Table 1.

Key	Function	Operation
0 Is	F0	Read paper tape
1 Is	F1	Write paper tape
2 Is	F2	Program 8708 EPROM, compare
3 Is	F3	Compare 8708 EPROM
4 Is	F4	Transfer 8708 EPROM to RAM
5 Is	F5	Move block memory
6 Is	F6	Hexadecimal calculator, +, -
7 Is	F7	Byte search memory, optional mask
8 Is	F8	Word search memory, optional mask
9 Is	F9	Program 8755 EPROM, compare
A Is	FA	Compare 8755 EPROM
B Is	FB	Transfer 8755 EPROM

Table 1. PROMPT 80/85 Functions

## FUNCTIONAL DESCRIPTION

PROMPT is a low cost programming tool. It is a micro-computer design aid — not a development system with sophisticated software and peripherals. Intellec PROMPT 80/80 simplifies the programming of 8080/8085 processors and ISBC 80 and System 80 microcomputers, as well as 8708/8755 EPROMs and 8255/8251 programmable I/O devices. The heart of PROMPT 80/85 is the popular ISBC 80/10 Single Board Computer, a complete computer on a single printed circuit board. The ISBC 80/10 includes an 8080A, 1K bytes of static RAM memory, and sockets for 4K bytes of EPROM memory. Signals to the ISBC 80/10 include 48 programmable, parallel I/O lines with sockets for interchangeable line drivers and terminators, a programmable serial channel, a multi-source single level interrupt network, and bus

## Input/Output Group

The input/output (I/O) group features two fully implemented 8-bit ports, both with displays, and with latch switches for the input port E9. The port addresses are clearly marked E8 and E9. Those two ports and a third, at EA, are easily accessible on the I/O ports connector. Negative true logic is used throughout the I/O group and ports connector to enhance noise immunity and allow wire-ANDING.

drivers for memory and I/O expansion. Read only memory may be added in 1K-byte increments using Intel 8708 EPROMs or 8308 ROMs. A block diagram of the PROMPT 80/85 is shown in Figure 1.

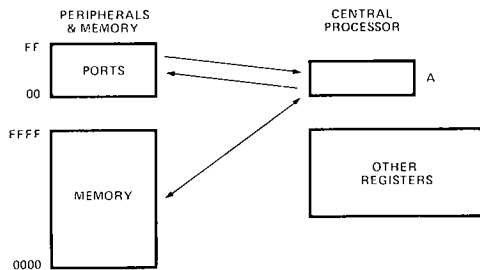


Figure 1. PROMPT 80/85 Block Diagram

### 8080A Processor

The central processor for PROMPT's iSBC 80/10 is Intel's powerful 8-bit n-channel MOS 8080A CPU. The 8080A contains six 8-bit general purpose registers and an accumulator. The six general purpose registers may be addressed individually or in pairs, providing both single and double precision operations.

### Addressing

The 8080A has a 16-bit address bus which allows direct addressing of up to 64K bytes of memory. An external stack, located anywhere in read/write memory, may be used as a last-in/first-out store. The contents of the program counter, accumulator, flags, and all of the general purpose registers are stacked using a 16-bit pointer. Subroutine nesting is bounded only by memory size.

### Programming

PROMPT encourages the preparation and verification of small, modular routines which together may comprise sizable programs. These are written in assembly language, then entered in machine language and debugged with calculator-like ease on the large, informative display and keyboard panel. Many 8080 operations can be specified with only two strokes. Once entered, programs can be exercised one instruction (single step) or many instructions at a time. And, any of the 8080 registers can be watched while single stepping.

### Memory

Programs are readily saved and instantly reloaded via UV Erasable, Electrically Reprogrammable ROMs (EPROMs). PROMPT 80/85 can program the popular 8708 EPROMs in small blocks, so routines can be debugged and saved incrementally. Several programs are prerecorded as examples on PROMPT's spare 8708 EPROMs.

### Interface

PROMPT 80/85 is a complete, fully assembled and powered 8080 microcomputer, including RAM, I/O, and system monitor in ROM. Twenty-four lines of programmable, TTL-compatible, parallel I/O are easily accessed

on a panel connector. Two 8-bit ports are fully implemented, one with displays for output, the other with displays and switches for input. PROMPT's programmable serial I/O interfaces directly with most terminals. A teletypewriter or CRT can be used, but neither is required because of PROMPT's built-in keyboard and display.

### Optional Expansion

PROMPT 80/85's iSBC 80/10 may be expanded via the iSBC 604 Modular Cardcage as shown in Figure 2. The cardcage houses the iSBC 80/10 and up to three expansion boards. Memory and I/O can be added in various combinations. Additional power may be required.

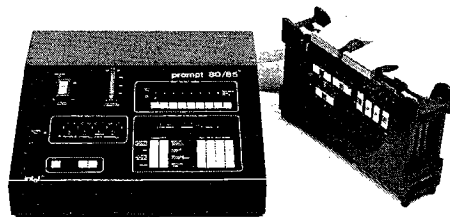


Figure 2. PROMPT 80/85 Expanded with iSBC 604 Modular Cardcage

### Applications

A Specialized PROM Programmer kit, the PROMPT-SPP, allows PROMPT 80/85 to serve as an economical 8708/8755 Specialized PROM Programmer peripheral in Intel microcomputer development systems. The PROMPT-SPP cable plugs directly into the rear panel of the Intel Microcomputer Development System, as shown in Figure 3.

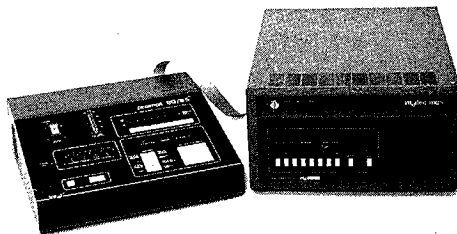


Figure 3. PROMPT 80/85 Used as an Intel Microcomputer Development System Peripheral

### Documentation

The PROMPT 80/85 manual includes chapters for the reader with little or no programming experience. Topics treated range from the number system to microcomputer hardware design. A novel, unifying set of tutorial diagrams — MICROMAPS — simplify microcomputer concepts. Programming pads aid in the organization and documentation of programs. These features, plus a comprehensive design library of manuals, articles, and applications notes, make Intellec PROMPT 80/85 ideal for the newcomer to microcomputing.

## SPECIFICATIONS

### Word Size

Instruction — 8, 16, or 24 bits

Data — 8 bits

### Timing

Basic Instruction — 1.95  $\mu$ s

Cycle Time —  $t_{CY} = 488 \mu$ s

Clock — 2.058 MHz  $\pm$  0.1%

### Memory Bytes

Up to 48K bytes may be added using optional RAM, ROM, or PROM expansion boards and the ISBC 604 Cardcage.

Memory	Addressing	On Board	Monitor Uses
ROM/PROM	0-0FFF <sub>16</sub>	4096	2048 or 3072
RAM	3C00-3FFF <sub>16</sub>	1024	114

### I/O Addressing

Ports E4 to E7 are dedicated to PROMPT's display/key-board groups. Ports E8 to EB drive the panel I/O ports connector and PROM socket.

Dedicated to Display/Keyboard					I/O Ports Connector PROM Socket				Serial I/O USART	
	A	B	C	Control	A	B	C	Control	Data	Control
Port	E4	E5	E6	E7	E8	E9	EA	EB	EC	ED

### Parallel I/O

The panel I/O ports can be defined input or output by outputting control words to port address EB.

HEX Control Word (OUT this to EB)	Port E8 Bits 7-0	Port E9 Bits 7-0	Port EA	
			Bits 7-4	Bits 3-0
80	Output	Output	Output	Output
81	Output	Output	Output	Input
82	Output	Input	Output	Output
83	Output	Input	Output	Input
84 or 85	Output	Strobed output	Output	Bits 2, 1, 0 are strobes
86 or 8	Output	Strobed input	Output	

All input ports are TTL compatible. Ports E8 and EA are one-load fully TTL compatible as output. Port E9 is ordinarily used as Input. When used as output, E9 can sink at least one low power TTL load.

### Serial I/O

The serial I/O port is defined by software and jumper. PROMPT is configured at the factory for 20 mA current loop TTY interface, but can easily be jumpered for RS-232C levels. Asynchronous or synchronous transmission, data format, control characters, parity, and transmission rate can be programmed.

### Interrupts

PROMPT 80/85 provides a panel user interrupt to 3C02<sub>16</sub>. The ISBC 80/10 supports single level vectoring to location 38<sub>16</sub>. Request may originate from user specified I/O (2), the parallel ports (2), or serial port (2).

### EPROM Programming

8708/2708/2704 EPROMs can be programmed in multiple blocks of 16 bytes. Starting and ending memory address need only differ by a multiple of 16, and starting EPROM address and XX0 hexadecimal (X = don't care). Programming time is 115 sec for 1K byte, 3 sec for 16 bytes. 8755 EPROMs can be programmed at any addresses using the optional PROMPT 875 adaptor. Programming time is 52 sec for 1 K byte. EPROMs may be erased by exposure to high intensity short-wave ultraviolet light at a wavelength of 2537Å. The recommended integrated dose (UV intensity  $\times$  exposure time) is 10W-sec/cm<sup>2</sup>.

### System Monitor

Resides in three 8308 ROMs, 0 to 3FF<sub>16</sub>, 400<sub>16</sub> to 7FF<sub>16</sub> and 800<sub>16</sub> to BFF<sub>16</sub>. The third ROM implements F functions and can be removed. PROMPT has an unused ROM/EPROM socket at address C00<sub>16</sub> to FFF<sub>16</sub>.

### Commands

Examine/modify register  
Go (with optional breakpoints)  
Scroll register display  
Next ☐  
Display/modify memory  
Single step  
Open previous/clear entry  
☐ Execute/end

### Functions

- ① Read tape
- ① Write tape
- ② Program 8708, compare
- ③ Compare 8708
- ④ Transfer 8708 to RAM
- ⑤ Move block memory
- ⑥ Hexadecimal calculator, +, -
- ⑦ Byte search memory, optional mask
- ⑧ Word search memory, optional mask

### With 875 adaptor

- ⑨ Program 8755, compare
- ⑩ Compare 8755
- ⑪ Transfer 8755

### Software Drivers

Panel keyboard input  
Console terminal input  
TTY reader input  
Panel display output  
Console terminal output  
TTY punch output

### Connectors

PROMPT panel I/O ports  
ISBC 80/10 parallel I/O  
ISBC 80/10 serial I/O  
ISBC 80/10 bus  
ISBC 80/10 auxiliary bus  
3M 3425 flat  
3M 3415 flat  
3M 3462 flat  
CDC VPB01E43D00A1  
TI H312130

## Equipment Supplied

**PROMPT 80/85** — Mainframe with iSBC 80/10, display/keyboard

**PROM** — Programmer, power supply, cabinet, and ROM-based system monitor.

**8708 EPROMs** — 2 each, with pre-recorded example programs

**110V AC power cable** — 110 or 220V AC fuse

## Compatible Equipment

**PROMPT-875** Optional 8755 programming adaptor.

**PROMPT-SER** Serial cable connects PROMPT to TTY, CRT.

**PROMPT-SPP** Specialized PROM programmer kit connects PROMPT 80/85 to Intellec micro-computer development systems for 8708/8755 EPROM programming.

## Physical Characteristics

**Height** — 5.3 in. (13.5 cm) max

**Width** — 17 in. (43.2 cm)

**Depth** — 17 in. (43.2 cm) max

**Weight** — 21 lb. (9.6 kg)

## Electrical Characteristics

Either 115 or 230V AC ( $\pm 10\%$ ) may be switch selected on the mainframe. 1.8 amps max current (at 125V AC). Frequency is 47–63 Hz. Fixed over-voltage protect on 5V supply 6.2–6.7 volts.

## AC Power Requirements

Voltage	Internal PROMPT 80/85 Supply	PROMPT 80/85 Requires
+ 26.5	0.1A	0.03A
+ 12	1.2A	0.5A
+ 5	6.0A	5.0A
– 5	0.3A	0.1A
– 12	0.3A	0.2A

## Environmental Characteristics

**Operating Temperature** — 10°C to + 40°C

**Non-Operating Temperature** — 20°C to + 65°C

## Reference Manuals

**9800307** — Intellec PROMPT 80/85 User's Manual (SUPPLIED)

**9800452** — 8080/8085 Floating-Point Arithmetic Library User's Manual (SUPPLIED)

**9800301** — 8080/8085 Assembly Language Programming Manual (SUPPLIED)

**9800316** — System 80/10 Reference Manual (SUPPLIED)  
Design Library of Application Notes, Article Reprints (SUPPLIED)

Reference manuals are shipped with each product only if designated SUPPLIED (see above). Manuals may be ordered from any Intel sales representative, distributor office or from Intel Literature Department, 3065 Bowers Avenue, Santa Clara, California 95051.

## ORDERING INFORMATION

### Part Number Description

**PROMPT-80 or PROMPT-80-220V** Intellec PROMPT 80/85 MCS80/85 Micro-Computer Design Aid. Complete with iSBC 80/10 Single Board Computer (8080 CPU), integral keyboard, displays, and EPROM programmer.